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Cavin – The Mobile & Autonomous E-Car Charging System

Service Description

Our service consists of a mobile e-charging service called Cavin, whose mobility is solar-powered. Cavis is an autonomous robot equipped with Artificial Intelligence, a GPS system and sensors. The Cavin robot communicates via the Cavin app with the owners of e-cars, by sending out service requests, providing a cost overview and signalling charging time. The so called home base is the storage and charging facility of Cavin as well as all the charging units.

Scenario 2040

- By 2040 Artificial intelligence is even further developed and making the application and use of robots increasingly normal.
- Oil is an increasingly scarce resource, as we have been depleting our world's resources. At this point we have almost run out of oil but until that happens, oil prices will increasingly rise.
- The vanish of oil paired with more rigid environmental measures (e.g. EU Green Deal), has forced industries to switch to renewable energy sources.
- The demand for electric cars has risen up to 30-40%.
- Furthermore, the concept of the sharing economy has been established as we moved away from ownership over products and are moving towards a sharing culture.
- This has cost benefits for the respective users and makes the most efficient use of the available resources.

Service Process

1. Sitting in his home base, Cavin senses e-cars with low energy and sends a charging request to the e-car owner via the Cavin app.

2. The e-car owner can set the charging time, deny the request fully or place an order for later.

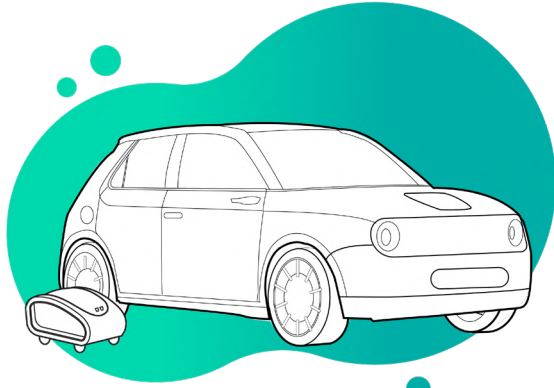
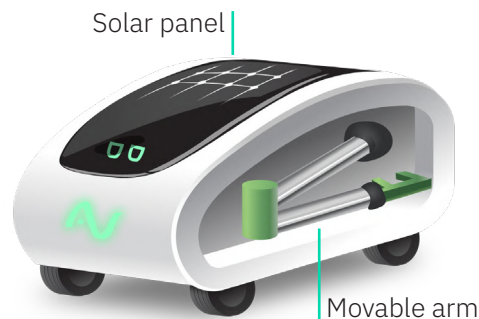
3. In the case of charging approval, Cavin moves to the e-car with low energy. To ensure a smooth journey to the e-car, the intelligence software of Cavin helps it to avoid obstacles in the way.

Cavin Device – Technology and Properties

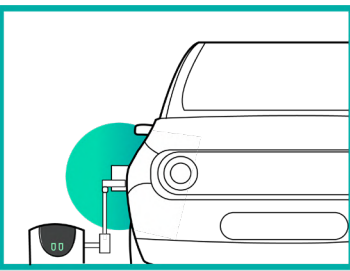
Cavin is a solar-powered mobile e-charging system. The combination of technology and physical components enable the Cavin system to autonomously charge electric vehicles.

Logo

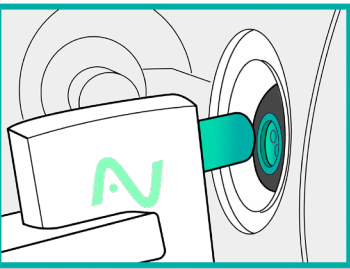
The logo is inspired from the letters 'A' and 'V' of Cavin. It also expresses electric flow.



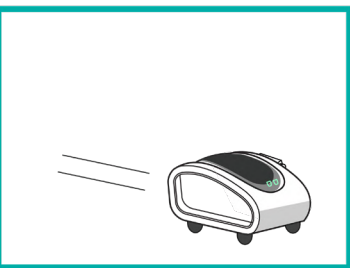
4. Cavin arrives at the e-car's location and with the help of AI it then recognizes the charging outlet of the e-car. During that time the e-car owner is free to go off and do whatever pleases her/him.



5. Cavin's movable arm reaches the car battery and connects the charging unit to the e-car for charging.



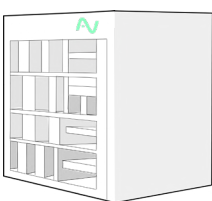
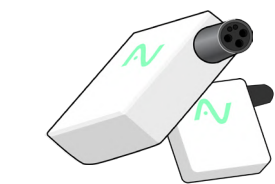
6. Cavin has various different charging unit plugs and has picked up the suitable one for this specific e-car at his home base. This way, Cavin can access all car types with the appropriate plug.



7. After completing charging, Cavin unplugs the charging unit, pulls down its arm and returns to his home base.



Cavin Home Base
The transparent walls protect the system from external influences, while an automatic door only allows access to Cavin.



Service Features

- Fast charging, long lasting battery performance
- Cavin sensors low energy e-cars and sends charging requests
- No need for home instalments of e-charging devices
- Maintenance for e-charging and easy customer support
- Cavin comes to the users and not the users to Cavin
- Cavin is available all over Switzerland and bordering countries

Key User's Wants and Needs



Wants to partake in a responsible use of resources

Does not want to be bothered with charging her/his e-car

Wants no maintenance of e-charging system and user-friendly customer support

Wants to be able to drive far distances without fear of running out of energy

Wants convenient e-charging while doing other things meanwhile

Service Impact

The Cavin home base is placed in suburbs, towns and cities all over Switzerland at recycling/garbage bin stations, as they already exist in our current landscape. The Cavin home bases are therefore designed to use existing spaces rather than creating new ones: that way we try to have a minimal impact on the appearance of the city landscape. We try to offer the service in a way that it creates minimal disruption.

However, we are aware that not only the environment but also people are still adapting, passing over responsibility and "trusting" in autonomous services and consequently also to our service concept.

Nevertheless, by 2040 technical innovations are advanced considerably and people are more or less already "used" to the increased use of autonomous robots. Still, education on the appropriate interaction with robots is needed. There might be initial scepticism or fear of robots such as Cavin. Therefore we implement friendly and kind looking characteristics to Cavin, not mimicking any human shape, and strictly separating it from any human aspiration.

Environmental Values

Efficient use of energy

Cavin makes efficient use of energy: It moves around using only solar energy, while batteries and home stations are powered 100% by renewable energy (such as hydropower). A well-thought-through plan will make sure that Cavin covers key areas where e-car density is particularly high. The sensors of Cavin help it to detect nearby cars with low energy and go into action once needed, avoiding unnecessary charging.

Promote circularity

Continuous maintenance will prevent premature disposal. The reuse of components as well as the regular updates of the software will considerably contribute to the circularity of Cavin. There will be no unnecessary resource exploitation as the number of Cavin produced reflects the real need therefore avoiding overproduction.

Sharing economy

The service will contribute to a sharing economy as the ownership of individual home charging systems becomes obsolete. Through the Cavin system the user will have access to a high-quality charging system without having to invest in less performing systems designed for private users.



Business Value Proposition

Operational efficiency

With our service concept Cavin, we do not have the risk of running out of electrified parking lots, even if the number of e-cars will increase. We offer an incomparable quality service with simple, easy and minimal interactions with our customers.

Create successful story

We are contributing to building a sustainable, green network and work in collaboration with the government to ensure an overall better life through a durable, step-by-step developed service system.

Develop key technology

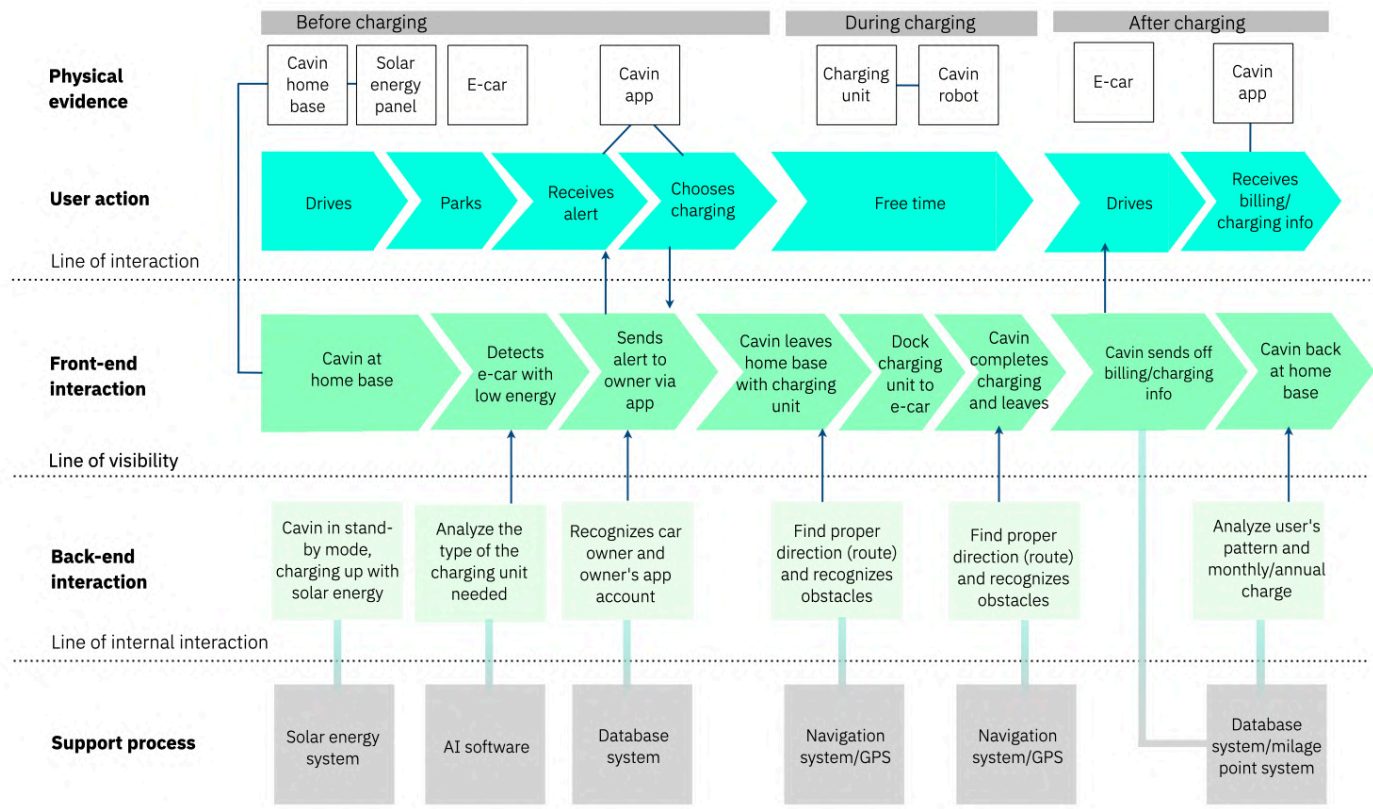
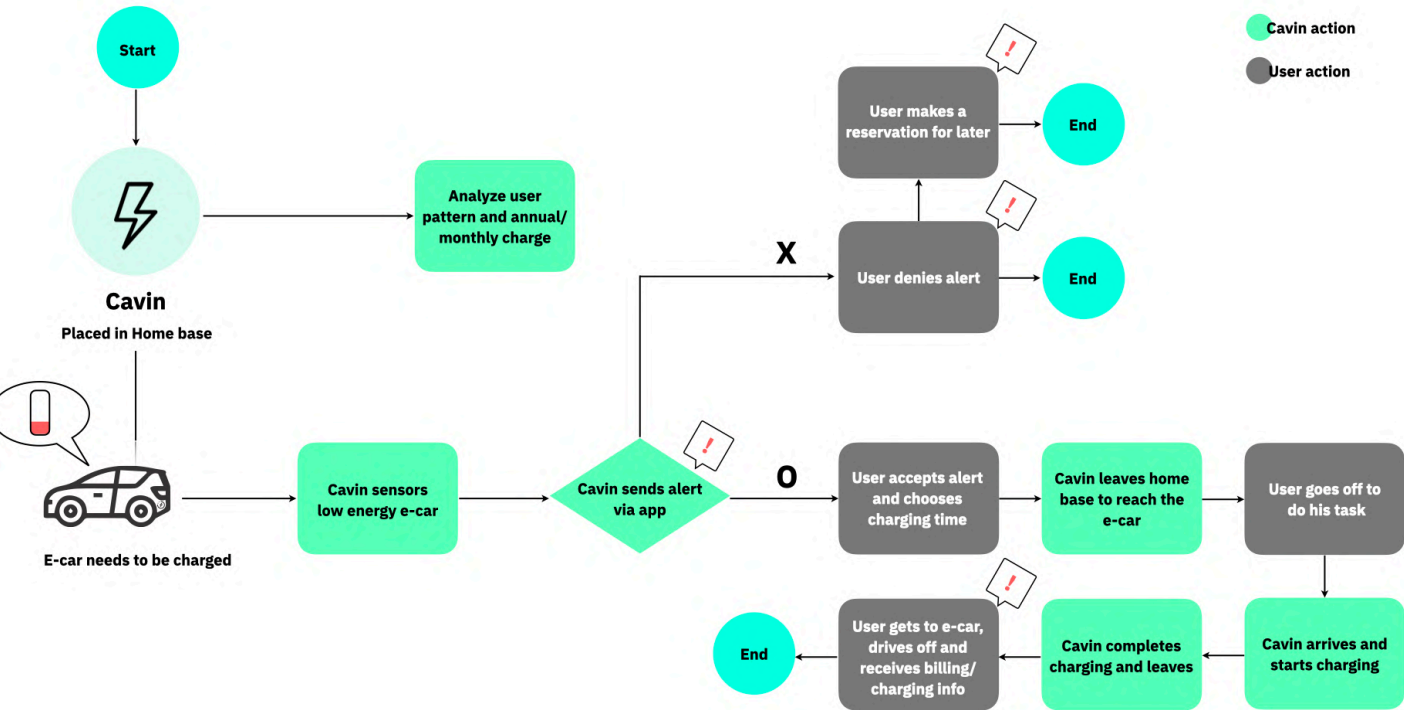
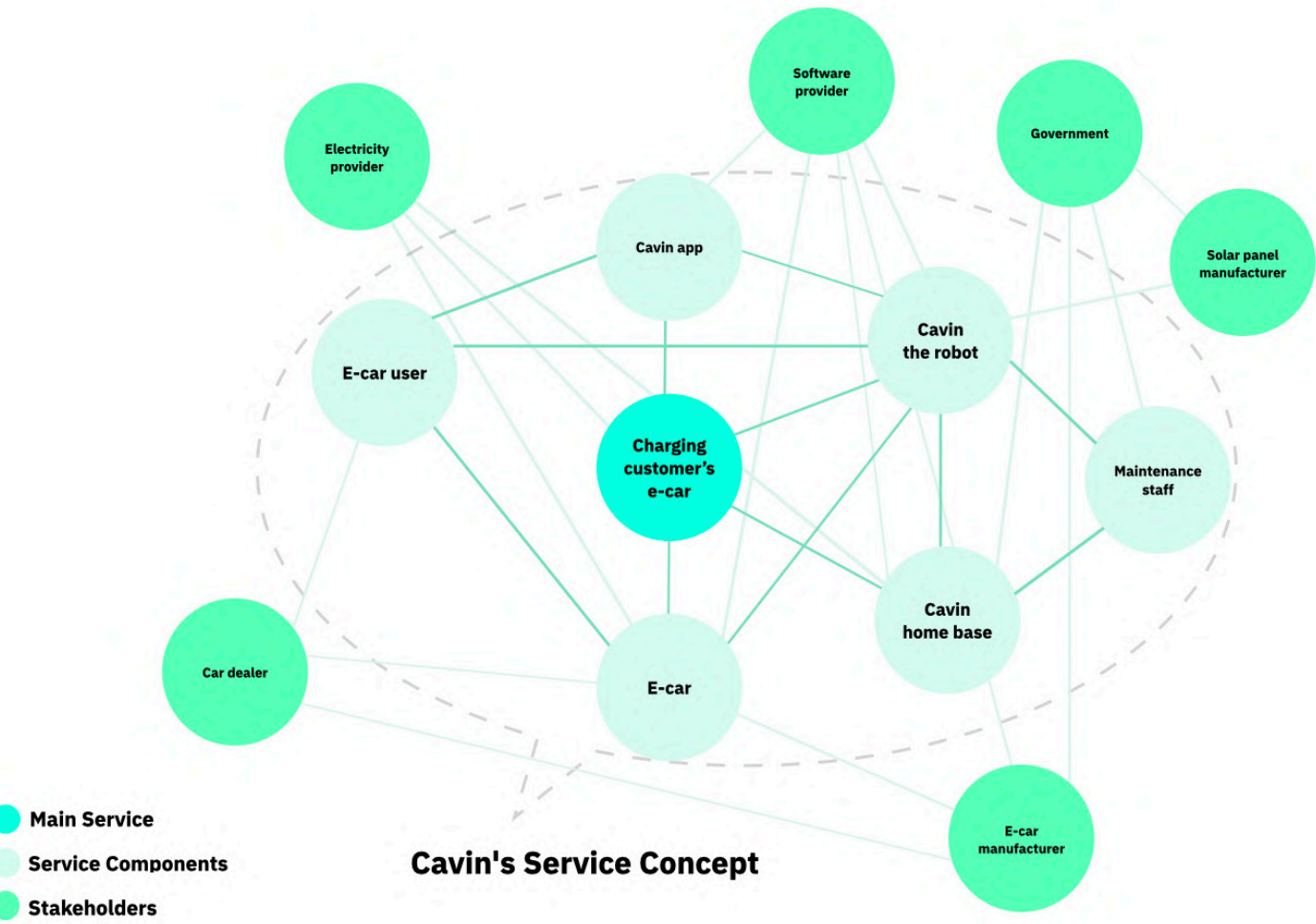
Establish long-term cooperation with e-cars manufacturers and e-charging station providers to co-create a seamless, unified and more accessible service.

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Cavin – Applied Frameworks

Customer Value Constellation

To place our service concept into a context we applied the customer value constellation framework. It shows the relationship between the different service components and the stakeholders (directly or indirectly) involved. In order for this service concept to be a success, we make sure to understand our stakeholders’ needs and establish a solid relationship with them.



Cavin Service Flow Chart

The service flow chart here illustrates the actions of a typical user and cavin in a journey.

This journey shows the minimal effort of the user when charging his e-car. With the help of our Cavin service, the user interaction is only passive, leaving the work to our autonomous robot. We see this as our main competitive advantage as cavin comes to the user and not the user to the system. We are avoiding complicated home instalments and for the customer to search and reach for often far away and full e-charging stations.

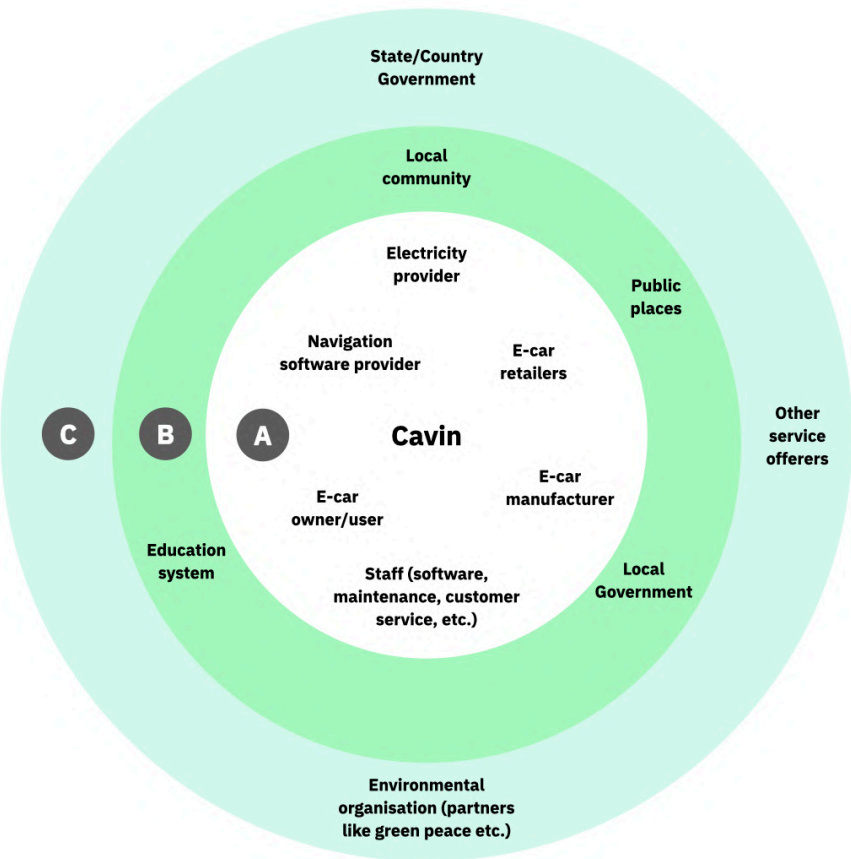
Cavin Service Blueprint

The service blueprint illustrates the complexity of our service and the various processes going on simultaneously. The cavin service operates on multiple levels consisting of the physical evidence, the user action, the front-and back-end interaction as well as the support processes.

In order to execute our service concept we have set in place solid support processes, working with different stakeholders such as for example our renewable energy electricity provider, solar panel and AI software providers. That way we can draw on the knowledge of experts.

Stakeholder Map

The stakeholder map is split up into essential stakeholders (A), important ones (B) and other stakeholders (C) which helps to establish the relationships we want to build up for our service and the needs and wants we need to address with our service concept in a broader context.



Customer Intervention Mapping

The CIM helps to explore and describe future circular product service systems. The tool visualises the points within a product's lifecycle where stakeholders are able to intervene in the product's expected journey.

